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had in a year or two from seed. It is suggested, however, that cuttings will generally prove more desirable. Of much importance is the fact that in COVILLE's experiments there were produced berries much beyond the usual size. The experiments were made chiefly on *Vaccinium corymbosum*, but it is believed that other species would show similar behavior.

In one of the later papers, COVILLE describes the changes in the formation of leaf mold, noting its early acidity and its subsequent alkalinity; whereas, peat (not only lowland peat, but also upland peat, as he terms it) retains its acidity, because of the comparative suspension of decay. In another paper, he urges farmers to utilize some of their acid soils by the growth of acid-tolerant plants, and not universally to neutralize them by the use of lime. The work of COVILLE is an excellent illustration of the application of ecological methods to agriculture.—H. C. COWLES.

Sexuality of Mucorales.—In his studies on the sexuality of the Mucorales, BLAKESLEE observed that the sporangium originating from the zygospore of *Phycomyces nitens* contains spores which with respect to sexual differentiation are of three types, giving rise respectively to plus, minus, and neutral mycelia. To account for the occurrence of these three sexually differentiated strains, BURGEFF³⁷ has formulated a hypothesis according to which the nature of the mycelium is determined by the nuclei which it contains. These may be either (+) or (-), and, since the spores contain one or more nuclei, it is evident that a particular spore may contain either all (+), or all (-), or both (+) and (-) nuclei. In the first two cases, the spores and the mycelium which they produce are said to be "homokaryotic," and in the other case "heterokaryotic." This hypothesis he tested in an ingenious manner. By inserting the tip of a young sporangiophore into the cut basal end of another of the opposite strain, and applying pressure to the wall of the outer one, he was able to rupture the tip of the inner hypha and bring about a mixture of the two masses of protoplasm with their respective (+) and (-) nuclei. Cultures from the sporangia produced by this "mixochimaera" gave (+), (-), and neutral mycelia.

He describes an analogous case of heterokaryosis presented by *Phycomyces nitens* var. *piloboloides*, which differs from the parent in the form of its sporangiophores. The spores of this variety give rise to mycelia which produce either *nitens* sporangiophores only, or *piloboloides* sporangiophores only, or both kinds mixed on the same mycelium. The homokaryotic types remain pure, but the mixed type continues to split in the manner described. Mixochimaeras, formed from the pure selected types, give rise to all three forms. Crosses of *P. nitens* with rigidly selected strains of the variety give rise to all possible forms of both (+) and (-) strains of both types and to heterokaryotic combinations. The production by means of the cross of a (-) strain of var. *piloboloides*, which is (+), is of special interest.—H. HASSELBRING.

³⁷ BURGEFF, H., Über Sexualität, Variabilität, und Vererbung bei *Phycomyces nitens*. Ber. Deutsch. Bot. Gesells. 30:679-685. 1913.